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Claims

[c1] 1. A gas dynamic pressure bearing unit comprising:
a stationary part having a cylindrical outer peripheral surface, and a flat surface extending in a radial direction of the cylindrical outer peripheral surface;
a rotary part having a hole with a cylindrical inner peripheral surface, and a flat surface extending in a radial direction of the cylindrical inner peripheral surface, said bearing hole into which said stationary part is inserted such that the stationary part and the rotary part can rotate relatively each other;
a radial bearing including radial bearing surfaces formed on said outer peripheral surface and said inner peripheral surface, a radial dynamic-pressure-generating groove row formed on one or both of the bearing surfaces, a radial micro-gap formed in between these bearing surfaces, and gas filling said micro-gap; and
a thrust bearing including thrust bearing surfaces respectively formed on said flat surface of said stationary part and said flat surface of said rotary part, a thrust dynamic-pressure-generating groove row formed on one or both of the thrust bearing surfaces, an axial micro-gap formed in between these thrust bearing surfaces,

and gas filling said micro-gap, wherein:
said radial micro-gap is connected to said axial micro-gap through an annular micro-gap portion;
said thrust bearing increases a pressure of said gas toward said annular micro-gap portion during relative rotation of said stationary part and said rotary part;
said radial bearing increases a pressure of said gas toward said annular micro-gap portion during relative rotation of said stationary part and said rotary part;
a portion of said radial micro-gap where the pressure of said gas is lowered comparing to the pressure of the gas at said annular micro-gap portion is in communication with a portion of said axial micro-gap where the pressure of said gas is lowered comparing to the pressure of the gas at said annular micro-gap portion; and
at least one particle catching hole is formed in said stationary part, which extends in radial direction of said cylindrical outer peripheral surface, opens to said annular micro-gap portion, the opening being adjacent to an end of one of grooves which constitute said dynamic-pressure-generating groove row.

[c2] 2. The gas dynamic pressure bearing unit as set forth in claim 1, wherein:
said stationary part comprises a shaft and a thrust plate, said cylindrical outer peripheral surface being a periph-

eral surface of the shaft, and said flat surface being a surface of the thrust plate; and

said rotary part comprises a cylindrical hollow sleeve, said bearing hole being the hollow of the sleeve, said cylindrical inner peripheral surface being the inner peripheral surface of the hollow of the sleeve, and said flat surface of the rotary part being an axial end flat surface of the sleeve.

[c3] 3. The gas dynamic pressure bearing as set forth in claim 2, wherein:

said shaft includes an enlarged portion whose diameter is enlarged comparing to other portions of the shaft, said radial bearing surface being a peripheral surface of the enlarged portion, an axial end of the enlarged portion having a flat face extending perpendicularly to the axis of the shaft,

one side of said thrust plate comes into surface-contact with and fixed to the flat face of the enlarged portion;

a groove extending in a radial direction of said shaft is formed on one or both of the flat face and the one side of said thrust plate; and

an opening side of the groove is closed by a surface contact between the one side of the thrust plate and the flat face of the enlarged portion, thereby forming the particle catching hole.

[c4] 4. The gas dynamic pressure bearing as set forth in claim 3, wherein:
said shaft comprises an inner shaft and an outer shaft fitted over the inner shaft; and
said enlarged portion comprises the outer shaft.

[c5] 5. The gas dynamic pressure bearing as set forth in claim 3, wherein:
both axial ends of said enlarged portion have said flat faces respectively;
said stationary part has two thrust plates, both of which come into surface-contact with and fixed to said flat faces, the thrust plates including thrust bearing surfaces respectively, the thrust bearing faces which are in opposed relation to each other;
said sleeve of said rotary part has said flat faces at both axial ends of the sleeve respectively, the flat faces including thrust bearing surfaces respectively, the thrust bearing faces which are in opposed relation to each other in a back to back relation; and
two thrust bearings are formed at both axial ends of the sleeve;

[c6] 6. The gas dynamic pressure bearing as set forth in claim 4, wherein:
both axial ends of said enlarged portion have said flat

faces respectively;

said stationary part has two thrust plates, both of which come into surface-contact with and fixed to said flat faces, the thrust plates including thrust bearing surfaces respectively, the thrust bearing faces which are in opposed relation to each other;

said sleeve of said rotary part has said flat faces at both axial ends of the sleeve respectively, the flat faces including thrust bearing surfaces respectively, the thrust bearing faces which are in opposed relation to each other in a back to back relation; and

two thrust bearings are formed at both axial ends of the sleeve;

[c7] 7. A spindle motor comprising:

said gas dynamic pressure bearing as set forth in claim 3;

a hub which integrally rotates with said rotary part;

a stator fixed to said stationary part; and

a rotor magnet which is fixed to the hub such as to be opposed to the stator, and which constitutes a magnetic circuit together with the stator.

[c8] 8. A spindle motor comprising:

said gas dynamic pressure bearing as set forth in claim 5;

a hub which integrally rotates with said rotary part;

a stator fixed to said stationary part; and

a rotor magnet which is fixed to the hub such as to be opposed to the stator, and which constitutes a magnetic circuit together with the stator.

[c9] 9. A spindle motor comprising:

said gas dynamic pressure bearing as set forth in claim 6;

a hub which integrally rotates with said rotary part;

a stator fixed to said stationary part; and

a rotor magnet which is fixed to the hub such as to be opposed to the stator, and which constitutes a magnetic circuit together with the stator.

[c10] 10. A recording disk drive comprising:

a housing;

said spindle motor as set forth in claim 7, the spindle motor being fixed to the housing;

a disk-like recording medium which is fixed to the hub, said recording medium capable of storing information; and

means for writing and/or reading a signal on a predetermined position of said recording medium.

[c11] 11. A recording disk drive comprising:

a housing;

said spindle motor as set forth in claim 8, the spindle

motor being fixed to the housing;

a disk-like recording medium which is fixed to the hub, said recording medium capable of storing information; and

means for writing and/or reading a signal on a predetermined position of said recording medium.

[c12] 12. A polygon scanner comprising:

a housing;

said spindle motor as set forth in claim 8, the spindle motor being fixed to the housing; and

a polygon mirror fixed to the hub.